

CLAIMS

1 1. A method for assigning priority to streams of compressed video data, comprising the
2 steps of:
3 determining a relative importance of each macroblock in a video frame based on
4 how often each macroblock acts as a reference macroblock; and
5 prioritizing each of the macroblocks in the video frame based on the relative
6 importance.

1 2. The method of claim 1, wherein the determining step includes the steps of:
2 reading a current P frame; and
3 examining motion vectors from previous and subsequent B frames, and from a
4 subsequent P frame if it exists, to determine how often each macroblock in the current P
5 frame acts as a reference macroblock for target macroblocks in the B and P frames.

1 3. The method of claim 2, wherein the determining step comprises the further step of
2 determining how often target macroblocks in the subsequent P frame act as reference
3 macroblocks.

1 4. The method of claim 1, wherein the determining step includes the steps of:
2 reading a current I frame; and
3 examining motion vectors from previous and subsequent B frames, and from a
4 subsequent P frame, to determine how often each macroblock in the current I frame acts
5 as a reference macroblock for target macroblocks in the B and P frames.

1 5. The method of claim 4, wherein the determining step comprises the further step of
2 determining how often target macroblocks in the subsequent P frame act as reference
3 macroblocks.

1 6. The method of claim 1, comprising the further steps of:
2 assigning B frame data a lowest relative priority;
3 assigning P frame data a priority relatively higher than B frame data; and
4 assigning I frame data a priority relatively higher than P frame data.

1 7. The method of claim 1, wherein if a current macroblock acts as a partial reference
2 macroblock, implementing the steps of:
3 determining an amount of pixel overlap between the current macroblock and a
4 corresponding reference macroblock; and
5 scaling the relative importance of the current macroblock based on the amount of
6 pixel overlap.

1 8. The method of claim 1, comprising the further step of assigning each macroblock into
2 one of a plurality of streams based on the prioritization step.

1 9. The method of claim 1, wherein the relative importance of each macroblock is further
2 determined based on values of a plurality of residual discrete cosine transform (DCT)
3 coefficients of the macroblock.

1 10. A method for assigning priority to streams of compressed video data, comprising the
2 steps of:
3 determining an importance value for each macroblock in a plurality of video
4 frames based on how often each macroblock acts as a reference macroblock;
5 grouping macroblocks into sets of macroblocks, and combining the importance
6 values of the macroblocks within each set; and
7 prioritizing each set of macroblocks based on the combined importance values.

1 11. The method of claim 10, wherein each set of macroblocks comprises a complete
2 frame of video data.

1 12. The method of claim 10, wherein the determining step includes the steps of:
2 reading a current P frame; and
3 examining motion vectors from previous and subsequent B frames, and from a
4 subsequent P frame if it exists, to determine how often each macroblock in the current P
5 frame acts as a reference macroblock.

1 13. The method of claim 10, wherein the determining step includes the steps of:
2 reading a current I frame; and
3 examining motion vectors from previous and subsequent B frames, and from a
4 subsequent P frame, to determine how often each macroblock in the current I frame acts
5 as a reference macroblock.

1 14. The method of claim 10, wherein each set of macroblocks comprises a group of
2 pictures.

1 15. The method of claim 10, wherein if a current macroblock acts as a partial reference
2 block, implementing the steps of:
3 determining an amount of pixel overlap between the current macroblock and a
4 corresponding reference macroblock; and
5 scaling the relative importance of the current macroblock based on the amount of
6 pixel overlap.

1 16. The method of claim 10, wherein the importance value of each macroblock is further
2 determined based on values of a plurality of residual discrete cosine transform (DCT)
3 coefficients of the macroblock.

1 17. A system for encoding streams of compressed video data, comprising:
2 an importance analysis system for determining an importance value for each
3 macroblock in a video frame based on how often each macroblock acts as a reference
4 macroblock; and
5 a system for prioritizing each of the macroblocks in the video frame based on the
6 importance value determined for each macroblock.

1 18. The system of claim 17, wherein the importance analysis system includes a P frame
2 analysis system that examines motion vectors from previous and subsequent B frames,
3 and from a subsequent P frame if it exists, to determine how often each macroblock in a
4 current P frame acts as a reference macroblock.

1 19. The system of claim 18, wherein the importance analysis system further comprises an
2 indirect analysis system that determines how often macroblocks in the subsequent P
3 frame are referenced by other video frames.

1 20. The system of claim 17, wherein the importance analysis system includes an I frame
2 analysis system that examines motion vectors from previous and subsequent B frames,
3 and from a subsequent P frame, to determine how often each macroblock in a current I
4 frame acts as a reference macroblock.

1 21. The system of claim 20, wherein the importance analysis system further comprises
2 an indirect analysis system that determines how often target macroblocks in the
3 subsequent P frame act as reference macroblocks.

1 22. The system of claim 17, further comprising an error protection system that adds error
2 protection to a stream of macroblock data based on a priority assigned to each
3 macroblock.

1 23. The system of claim 22, further comprising a stream decoding system that decodes
2 the streams of macroblock data back into a single stream of compressed data.

1 24. The system of claim 17, further comprising a partial macroblock analysis system that
2 computes an overlap between a current macroblock and the reference macroblock and
3 scales the importance value based on the overlap.

1 25. The system of claim 17, further comprising a residual analysis system that further
2 determines the importance value of each macroblock based values of a plurality of
3 residual discrete cosine transform (DCT) coefficients of the macroblock.

1 26. A system for prioritizing streams of compressed video data, comprising:
2 a system for determining an importance value for each macroblock in a plurality
3 of video frames based on how often each macroblock acts as a reference macroblock;
4 a system for grouping macroblocks into sets of macroblocks and combining the
5 importance values for macroblocks in each set; and
6 a system for prioritizing sets of macroblocks based on the combined importance
7 values.

1 27. The system of claim 26, wherein each set of macroblocks comprises a complete
2 frame of video data.

1 28. The system of claim 26, wherein each set of macroblocks comprises a group of
2 pictures.

1 29. The system of claim 26, further comprising a partial macroblock analysis system that
2 computes an overlap between a current macroblock and the reference macroblock and
3 scales the importance value based on the overlap.

1 30. The system of claim 26, further comprising a residual analysis system that further
2 determines the importance value of each macroblock based on values of a plurality of
3 residual discrete cosine transform (DCT) coefficients of the macroblock.

- 1 31. A decoder system for decoding multi-priority compressed video data, comprising:
- 2 a system that correlates an error protection scheme to each of a plurality of data
- 3 streams; and
- 4 a system that interprets each data stream based on the error protection scheme;
- 5 wherein the error protection scheme is determined by an prioritization system that
- 6 prioritizes each data stream based on how often macroblocks act as reference
- 7 macroblocks.

1 32. A program product stored on a recordable media, that when executed, prioritizes
 2 streams of compressed video data, the program product comprising:
 3 means for determining an importance value for macroblock data in video frames
 4 based on how often each of a plurality of macroblocks act as reference macroblocks; and
 5 means for prioritizing macroblock data based on the determined importance
 6 values.

1 33. The program product of claim 32, wherein the determining means comprises:
 2 means for analyzing a current P frame by examining motion vectors from
 3 previous and subsequent B frames, and from a subsequent P frame if it exists, to
 4 determine how often each macroblock in the current P frame acts as a reference
 5 macroblock; and
 6 means for analyzing a current I frame by examining motion vectors from previous
 7 and subsequent B frames, and from a subsequent P frame, to determine how often each
 8 macroblock in the current I frame acts as a reference macroblock.